

WHAT IS CLAIMED IS:

1. A purification material comprising:
an aluminosilicate having average pore diameters ranging between about 100 angstroms and about 300 angstroms;
one or more transition fumed metal oxides, metal hydroxide, or combination thereof, either atomically distributed on or in the aluminosilicate, or associated with the aluminosilicate as particles having an average diameter of below about 50 μm .
2. The purification material of claim 1, wherein the transition metal oxide or hydroxide comprises a titanium oxide.
3. The purification material of claim 2, wherein the fumed titanium oxide comprises fumed titanium dioxide.
4. The purification material of claim 1, wherein the aluminosilicate contains at least one amorphous region.
5. The purification material of claim 1, having an average particle size between about 1 μm and about 50 μm , 2 – 200 mesh.
6. The purification material of claim 1, wherein the transition metal oxide resulted from a fuming process.
7. A method for making the purification material of claim 1, comprising:
mixing aluminum hydrate, alkali metal silicate, sodium hydroxide, and fumed transition metal oxide in water; and

irradiating the resulting mixture with UV radiation of wavelength ranging from about 2000 to about 3900 angstroms for at least 1 hour.

8. The method of claim 7, wherein the transition metal oxide is added in an amount ranging from 2 wt% to about 10 wt%, based on the weight of the resulting aluminosilicate in the composition.

9. The method of claim 7, wherein the transition fumed metal oxide is fumed titanium dioxide.

10. The method of claim 9, wherein the irradiation occurs over a period of about 5 to 14 days.

11. The method of claim 7, further comprising heating the irradiated material to a temperature at or above 350 - 600 °C for at least 1 hour.

12. The method of claim 11, wherein the heating occurs for a period of around 8 hours.

13. A method for removing contaminants from a fluid, comprising contacting the fluid with the purification material of claim 1 for a sufficient time to reduce the concentration of at least one contaminant in the fluid.

14. The method of claim 13, wherein the contaminants comprise volatile organic compounds.

15. The method of claim 14, wherein the volatile organic compounds comprise halocarbon compounds.

16. The method of claim 14, wherein the volatile organic compounds comprise ethylene.

17. The method of claim 13, wherein the fluid comprises water or aqueous solution.
18. The method of claim 13, wherein the contaminants comprise microorganisms.
19. The method of claim 18, wherein the microorganisms comprise bacteria.
20. The method of claim 19, wherein the bacteria comprise E. coli.
21. The method of claim 18, wherein the microorganisms comprise virii.
22. The method of claim 21, wherein the virii comprise polio or MS 2.
23. The method of claim 13, wherein the microorganism comprises algae.
24. The method of claim 13, wherein the contacting comprises floating the composition in water for a period of time sufficient to reduce the level of one or more contaminants.
25. The method of claim 13, wherein the fluid is selected from the group consisting of municipal or drinking water supplies, swimming pools, spas, and cooling tower water.
26. A method of purifying air by contacting the air with the composition of claim 1 for a time sufficient to reduce the concentration of volatile organic compounds in the air.
27. The method of claim 26, further comprising exposing the air to UV light during the contacting.
28. The method of claim 26, further comprising exposing the air to infrared light during the contacting.
29. The method of claim 26, further comprising exposing the air to halogen light during the contacting.

30. The method of claim 26, wherein the composition is in the form of granular material of particle size 20 x 80 mesh.
31. The method of claim 26, wherein the composition is in the form of a non-woven material impregnated with particles having size ranging from 1 – 100 micron.